During melting down, the heat required would be diminished by the oxidising action of the furnace as follows:—
0-2 per cent. P x 11= 2-2 calories . . - (from 00) 0-6 „
MnXl7 = 10-2 „ ... .. (from 61)
1-2 „ 0 X 14=16-8 „
Total 29-2 calories LessO-3 „ Six 15=*=t-5 „ . .
. (from 58)
Net 24*7 calories
— ---- .—.
The heat required up to finishing would be increased by the action of the ore to the extent of:
0-7 per cent. Six05=45 calories
0-3 „ PX40 = 12
2-8 „ 0X25 = 70___,,____
127 calories
Less 1 *4 per cent, Mn X 7=_10 ,,____
Net 117 calories.
The surplus heat which would have to be provided per kilogramme steel would amount to 117 — 24 = 93 calories, or about 27 per cent., and would be still further considerably increased if the ore employed contained silica.
In conjunction with this, instead of a charge shrinkage of (1 per cent. Si + 1 per cent. Pe) + 0*5 per cent. P + 2 per cent. Mn + (4 per cent. C + 0'2 per cent. F«) = 8'7 per cent., there must be produced a charge growth of
0-7 Six 1-00=0-7 per cent. . vide ((>9)
0-3 Px2-00=0-6 „ . „ (71)
2-800 X 1-47=4-1 „ . „ (75)
5*4 per cent.
Less 1-4 per cent. MnxO'32
-j-above 2'S1 =2-75 „ . ,, (74) and foregoing.
Net 2'(55 per cent.
This provides some compensation for the great heat demand and for the higher cost of charge, which is to be attributed to the ore requirement.
It is not difficult to ensure this latter advantage if one adopts the mode of vorking which is given in the description of the pig-iron process with molten charges.
The figures ascertained for the increase of the heat required * Oxidising action during melting down.